

AQ-SPEC

Air Quality Sensor Performance Evaluation Center

Sensor Description

Manufacturer/Model:
2B Technologies POM
(FEM EQOA-0815-227)

Pollutant: Ozone

Linear Dynamic Range:
2 ppb - 10 ppm

Type: UV Absorption

Time Resolution:
10-second to 1-hour



Additional Information

Field evaluation report:

<http://www.aqmd.gov/aq-spec/evaluations/field>

Lab evaluation report:

<http://www.aqmd.gov/aq-spec/evaluations/laboratory>

AQ-SPEC website:

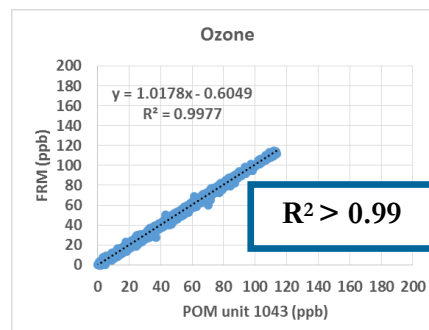
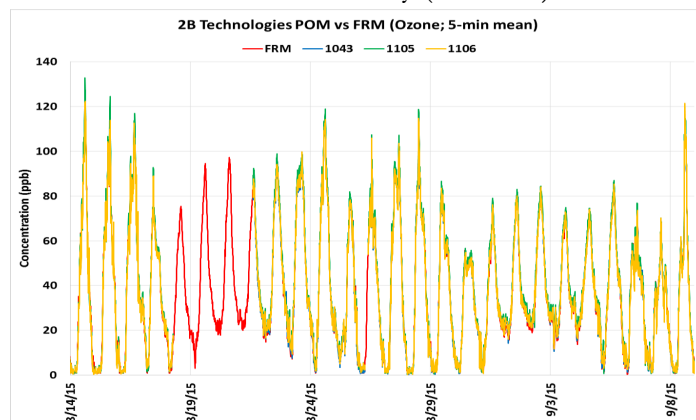
<http://www.aqmd.gov/aq-spec>

Evaluation Summary

- Overall, the three POM units showed high accuracy, compared to the FRM ozone monitor, for a concentration range between 0 to 400 ppb.
- The three POM units exhibited high precision during almost all tested environmental conditions (ozone conc., T and RH). POM 1122 experienced some instability at 5 °C, 40% RH and 20 °C, 65% RH.
- The three POM units showed low intra-model variability (~13%), as well as good data recovery (> 90%).
- They have high correlation with the FRM instrument from both the field ($R^2 > 0.99$) and laboratory studies ($R^2 > 0.99$).

Field Evaluation Highlights

- Deployment period 07/29/2015- 09/09/2015: the three POM units followed the ozone concentration change as monitored by FRM instrument.
- POM 1043, 1105, and 1106 had 99%, 92%, and 91% data recovery, respectively.
- The units have low intra-model variability (+/- 10%).



Coefficient of Determination (R^2) quantifies how the three sensors followed the ozone concentration change by FRM.

An R^2 approaching the value of 1 reflects a near perfect agreement, whereas a value of 0 indicates a complete lack of correlation.

Laboratory Evaluation Highlights

Accuracy $A (\%) = 100 - \frac{|\bar{X} - \bar{R}|}{R} * 100$

Three brand new POMs were used in the lab testing.

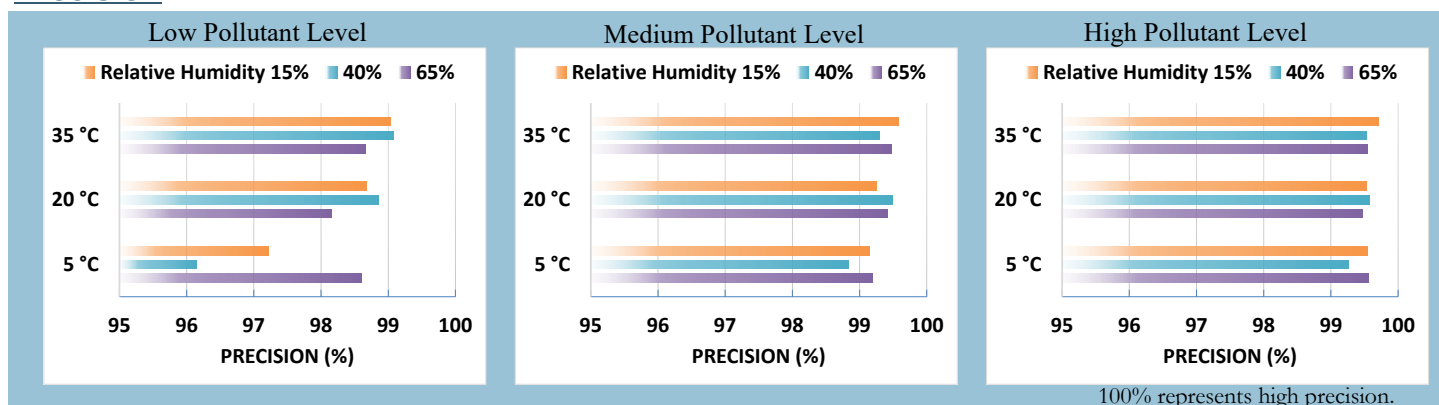
Steady State (#)	Sensor mean (ppb)	FRM (ppb)	Accuracy (%)
1	37.1	41.0	90.5
2	73.8	82.1	89.9
3	107.1	120.8	88.6
4	212.7	235.0	90.5
5	296.8	330.9	89.7

Accuracy was evaluated in a concentration ramping experiment at 20 °C and 40%. The sensor's readings at each ramping steady state were compared to the reference instrument.



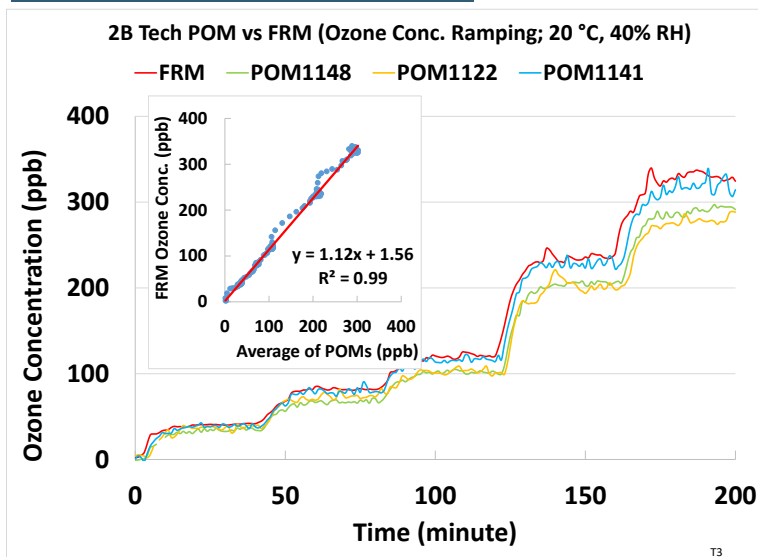
The higher the positive value (close to 100%), the higher the sensor's accuracy.

Precision



Sensor's ability of generating precise measurements of ozone concentration at low, medium, and high pollutant levels were evaluated under 9 combinations of T and RH, including extreme weather conditions like cold and humid (5 °C and 65%), hot and humid (35 °C and 65%), cold and dry (5 °C and 15%), and hot and dry (35 °C and 15%).

Coefficient of Determination



The three POM units showed excellent correlation with the corresponding FRM data ($R^2 > 0.99$) at 20 °C and 40% RH.

Climate Susceptibility (Coefficient of Determination R^2)

R^2	5 °C	20 °C	35 °C
15%	0.99	0.99	0.99
40%	0.99	0.99	0.99
65%	0.99	0.99	0.99

From the laboratory studies, temperature and humidity did not affect 2B POM's correlation with FRM instrument.

Observed Interferents

None.



All documents, reports, data, and other information provided in this document are for informational use only. Mention of trade names or commercial products does not constitute endorsement or recommendation. The South Coast AQMD's AQ-SPEC program, as a government agency, recommends the interested parties to make purchase decisions based on their application.